

REMARKS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1, 4-7, 9-12, and 15-21 are currently pending. Claims 8, 13, and 14 have been canceled without prejudice; and Claims 1 and 19-21 have been amended by the present amendment. The changes to the claims are supported by the originally filed specification and do not add new matter.

In the outstanding Office Action, Claims 1, 4-6, 8-13, 15, 16, and 18-21 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 7,103,586 to Holenstein et al. (hereinafter “the ‘586 patent”) in view of U.S. Patent No. 5,903,881 to Schrader et al. (hereinafter “the ‘881 patent”); and Claims 7, 14, and 17 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the ‘586 and ‘881 patents, further in view of U.S. Patent No. 6,725,341 to Peir et al. (hereinafter “the ‘341 patent”).

Applicants wish to thank the Examiner for the interviews granted Applicants’ representative on October 23, 2008, and December 8, 2008, at which time a proposed Examiner’s amendment to the claims was discussed. In particular, the Examiner indicated that Claim 1 would be allowed if amended to incorporate the limitations recited in dependent Claims 8, 13, and 14. However, regarding independent Claims 19-21, the Examiner indicated that she would prefer that a response be formally filed including amendments to those claims, rather than an Examiner’s amendment being entered. Accordingly, the present amendment amends Claims 1 and 19-21 to incorporate limitations similar to those recited in original Claims 8, 13, and 14.

Amended Claim 1 is directed to a concurrency control method in a transaction processing system for processing a plurality of transactions in parallel with respect to hierarchical data, the concurrency control method comprising: (1) producing a copy of the

hierarchical data at a time of starting an access to the hierarchical data by each transaction; (2) judging whether a collision between one of reading access or writing access to be made by a first transaction with respect to a copy of the hierarchical data for the first transaction and another one of the reading access or writing access made by the second transaction with respect to a copy of the hierarchical data for the second transaction will occur or not, when the first transaction and the second transaction are accepted at the same time as concurrent transactions for accessing the same location of the hierarchical data, wherein the first transaction is started earlier than the second transaction; (3) carrying out a processing for avoiding the collision due to the concurrent transactions when the judging step judges that the collision will occur; and (4) reflecting a writing access made by the first transaction with respect to a copy of the hierarchical data for the first transaction, on the hierarchical data, when the first transaction is to be finished normally, and reflecting the writing access made by the first transaction also on a copy of the hierarchical data for the second transaction if the second transaction is not finished yet, wherein a third copy of the hierarchical data is provided in which all the transactions having been finished are reflected; and when the first transaction is to make the reading access with respect to a copy of the hierarchical data, the judging step judges whether the collision will occur or not according to whether first data looked up by making the reading access with respect to the copy of the hierarchical data for the first transaction and second data looked up by making the reading access with respect to the third copy are identical or not, wherein when the first transaction is to make the writing access with respect to a copy of the hierarchical data, the judging step judges whether the collision will occur or not according to whether first data looked up by making the reading access of the second transaction and second data looked up by making the reading access of the second transaction with respect to a state of the hierarchical data after the writing access are identical or not, for all reading accesses by all transactions that make accesses to the

hierarchical data and that can be the second transaction, the method further including making the writing access with respect to a shared copy produced by copying the hierarchical data in order to reflect writing accesses made by all transactions that make accesses to the hierarchical data, when the first transaction is to make the writing access with respect to a copy of the hierarchical data; and storing states of the shared copy at timings at which the writing accesses were made by some of the transactions that make accesses to the hierarchical data, wherein the judging step obtains the first data as data obtained by reproducing a state of the hierarchical data at a timing at which the reading access was made by selecting one of stored states of the shared copy which is close to the state of the hierarchical data at a timing at which the reading access was made and making the writing access that was made by the second transaction with respect to a selected state of the shared copy according to need, and then making the reading access with respect to a reproduced state of the hierarchical data, wherein when there is an upper limit to a number of shared copies that can be recorded, those shared copies which has a higher possibility of being utilized at a time of reproducing a state in which the reading access is to be made later on are recorded at a higher priority, among the shared copies corresponding to states at times of the writing accesses with respect to the hierarchical data.

Claim 1 has been amended to incorporate limitations recited in Claims 8, 13, and 14. Accordingly, no new matter has been added.

Applicants respectfully submit that the rejection of Claim 1 is rendered moot by the present amendment to Claim 1. However, since Claim 1 has been amended to incorporate limitations recited in dependent Claim 14, Applicants will address the references cited in the rejection of Claim 14.

Regarding the rejection of Claim 1, the Office Action asserts that the ‘586 patent discloses everything in Claim 1 with the exception of the “hierarchical data limitation,” and

relies on the '881 patent to remedy that deficiency. Further, regarding Claim 14, Applicants note that the Office Action admits that the combined teachings of the '586 and '881 patents fail to disclose the limitation recited in Claim 14.

The '586 patent is directed to a method of replicating data associated with a plurality of transactions in a replication system including a plurality of nodes connected via communication media in a topology, including the steps of: (a) replicating the data from an originating node to one or more other nodes; and (b) pausing each transaction that is requested to be executed in the database at an originating node prior to a first I/O operation for the transaction upon detection that synchronization between the database at the originating node and the database at one or more of the other nodes cannot be ensured. However, as admitted in the outstanding Office Action, the '586 patent fails to disclose that when there is an upper limit to a number of shared copies that can be recorded, those shared copies which has a higher possibility of being utilized at a time of reproducing a state in which the reading access is to be made later on are recorded at a higher priority, among the shared copies corresponding to states at times of the writing accesses with respect to the hierarchical data, as recited in amended Claim 1.

The '881 patent is directed to a system having three simultaneously displayed items of information, including a list of transaction instructions, a list of uncleared transactions, and a list of cleared transactions. Further, the '881 patent discloses a database module that stores users' data in a combined relational-hierarchical data model that is used to organize accounts by a financial institution such that all transactions for each account are stored within the account.

However, Applicants respectfully submit that the '881 patent fails to remedy the deficiencies of the '586 patent. In particular, the '881 patent fails to disclose when there is an upper limit to a number of shared copies that can be recorded, those shared copies which has

a higher possibility of being utilized at a time of reproducing a state in which the reading access is to be made later on are recorded at a higher priority, among the shared copies corresponding to states at times of the writing accesses with respect to the hierarchical data, as recited in amended Claim 1.

The '341 patent is directed to a cache management system to enhance cache efficiency in shared memory distributed cache multiprocessor computer systems. As noted by the outstanding Office Action, the '341 patent discloses that "such rules that restrict memory write backs to lines likely to be needed in other caches serve to further limit the number of transfers over the system memory bus to alleviate risk of flooding the bus with L1 cache write-back activity." Applicants respectfully submit that this passage in the '341 patent relates only to limiting the traffic on the bus while maintaining cache coherence, by deferring write back operations such that write backs from the L1 to L2 cache are not written back to memory over the system bus if the write-through bit of the written back line is not on, and that the L1 to L2 write back is not written to system memory when the written back line is not present in another cache's IHT.

However, Applicants respectfully submit that the '341 patent fails to disclose when there is an upper limit to a number of shared copies that can be recorded, those shared copies which has a higher possibility of being utilized at a time of reproducing a state in which the reading access is to be made later on are recorded at a higher priority, among the shared copies corresponding to states at times of the writing accesses with respect to the hierarchical data, as recited in amended Claim 1.

Thus, no matter how the teachings of the '586, '881, and '341 patents are combined, the combination does not teach or suggest the limitation added to amended Claim 1 from original Claim 14. In this regard, Applicants note that the Examiner indicated that Claim 1 would be allowed if amended to incorporate the limitations of Claims 8, 13, and 14.

Accordingly, Applicants respectfully submit that Claim 1 (and all associated dependent claims) is in condition for formal allowance.

Independent Claims 19-21 recite limitations that are analogous to the limitations recited in Claim 1. Moreover, Claims 19-21 have been amended in a manner analogous to the amendment to Claim 1. Accordingly, for the reasons stated above, Applicants respectfully submit that the rejections of Claims 19-21 are rendered moot by the present amendment to those claims.

Applicants respectfully submit that the rejection of Claim 14 is rendered moot by the present cancellation of that claim. Further, Applicants respectfully submit that the rejections of Claims 7 and 17 are rendered moot by the present amendment to Claim 1.

Thus, it is respectfully submitted that independent Claims 1 and 19-21 (and all associated dependent claims) patentably define over any proper combination of the '586, '881, and '341 patents.

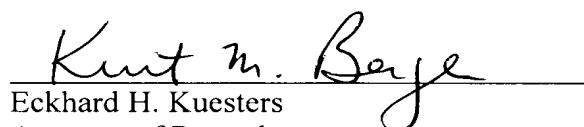
Consequently, in view of the present amendment and in light of the above discussion, the outstanding grounds for rejection are believed to have been overcome. The application as amended herewith is believed to be in condition for formal allowance. An early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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